IN THE CLAIMS:

Please amend Claims 1, 4, 7, 10, 13 and 14 as follows.

1. (Currently Amended) A method of optimally designing a structure comprising a step of obtaining a solution of a structure optimal designing problem~~, formulated as a dual optimization problem~~ having a first solution process to solve an optimization problem of a first evaluation ~~functional~~ function for a status variable vector and a design variable vector ~~and a second solution process to solve an optimization problem of a second evaluation functional for said status variable vector and said design variable vector~~, wherein ~~when said~~ the status variable vector is a displacement in each node, and ~~said~~ the design variable vector is ~~an~~ a rate of existence ~~ratio of~~ to a structural member in each element,

said first solution process ~~including said second solution process as one step, and further including~~ comprising:

a design variable update step of reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a first storage unit, updating ~~said~~ the design variable vector, and storing the updated design variable vector into said first storage unit~~;, and~~;

~~said second solution process including~~ a status variable update step of reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a second storage unit, updating ~~said~~ the status variable vector, and storing the updated status variable vector into said second storage unit, said status variable update step including a second solution process to solve an optimization problem of a second evaluation function for the status variable

vector and the design variable vector, wherein ~~said~~ the second evaluation function ~~at said second solution process comprises~~ corresponds a norm of a residual vector which is obtained as a difference between a nodal force vector and the status variable vector on which a global stiffness matrix is operated, and ~~said~~ the status variable vector is not initialized upon start of said second solution process; and

an output step of outputting the obtained solution.

2. (Original) The method according to claim 1, wherein at said first solution process, any one of a sequential linear programming method, an optimality criteria method, and a sequential convex function approximate method is executed.

3. (Original) The method according to claim 1, wherein at said second solution process, any one of a conjugate residual method, a GCR method, a GCR(k) method, an Orthomin(k) method, a GMRES(k) method and their derivative methods is executed.

4. (Currently Amended) A method of optimally designing a structure comprising a step of obtaining a solution of a structure optimal designing problem~~, formulated as a dual optimization problem~~ having a first solution process to solve an optimization problem of a first evaluation ~~functional~~ function for a status variable vector and a design variable vector ~~and a second solution process to solve an optimization problem of a second evaluation functional for said status variable vector and said design variable vector~~, wherein ~~when said~~ the status variable

vector is a displacement in each node, and ~~said~~ the design variable vector is ~~an~~ a rate of existence ~~ratio of~~ to a structural member in each element,

said first solution process ~~including said second solution process as one step, and further including~~ comprising:

a design variable update step of reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a first storage unit, updating ~~said~~ the design variable vector, and storing the updated design variable vector into said first storage unit~~;, and~~

~~said second solution process comprising a conjugate gradient method, and including a preconditioning step of executing preconditioning on a nodal force vector based on a global stiffness matrix, and~~ a status variable update step of reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a second storage unit, updating ~~said~~ the status variable vector, and storing the updated status variable vector into said second storage unit, said status variable update step including a second solution process to solve an optimization problem of a second evaluation function for the status variable vector and the design variable vector, wherein the second evaluation function corresponds a norm of a residual vector which is obtained as a difference between a nodal force vector and the status variable vector on which a global stiffness matrix is operated, and said second solution process comprising a conjugate gradient method, and including a preconditioning step of executing preconditioning on a nodal force vector based on a global stiffness matrix, and the ~~wherein said~~ status variable vector is not initialized upon start of said second solution process; and

an output step of outputting the obtained solution.

5. (Original) The method according to claim 4, wherein at said first solution process, any one of a sequential linear programming method, an optimality criteria method, and a sequential convex function approximate method is performed.

6. (Original) The method according to claim 4, wherein at said preconditioning step, a component in a row or column of the nodal force vector is set to 0 when a diagonal component in the corresponding row or column of the global stiffness matrix becomes 0.

7. (Currently Amended) An information processing apparatus for optimally designing a structure by obtaining a solution of a structure optimal designing problem~~,~~ ~~formulated as a dual optimization problem~~ having a first solution process to solve an optimization problem of a first evaluation ~~functional~~ function for a status variable vector and a design variable vector ~~and a second solution process to solve an optimization problem of a second evaluation functional for said status variable vector and said design variable vector~~, wherein ~~said~~ the status variable vector is a displacement in each node, and ~~said~~ the design variable vector is ~~an~~ a rate of existence ~~ratio of~~ to a structural member in each element, said apparatus comprising[[:]] a first solution module adapted to execute said first solution process[[,]] and ~~including~~ comprising:

design variable update means for reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a first storage unit, updating ~~said~~ the design variable vector, and storing the updated design variable vector into said first storage unit; ~~and~~

~~second solution module adapted to execute said second solution process during said first solution process, and including~~ status variable update means for reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a second storage unit, updating ~~said~~ the status variable vector, and storing the updated status variable vector into said second storage unit, said status variable update means including a second solution module adapted to execute a second solution process to solve an optimization problem of a second evaluation function for the status variable vector and the design variable vector, wherein ~~said~~ the second ~~solution module uses~~ evaluation function corresponds a norm of a residual vector ~~as said second evaluation function~~ which is obtained as a difference between a nodal force vector and the status variable vector on which a global stiffness matrix is operated, and ~~said~~ the status variable vector is not initialized upon start of ~~processing by said~~ the second solution ~~module~~ process; and

output means for outputting the obtained solution.

8. (Original) The information processing apparatus according to claim 7, wherein said first solution module performs any one of a sequential linear programming method, an optimality criteria method, and a sequential convex function approximate method.

9. (Original) The information processing apparatus according to claim 7, wherein said second solution module performs any one of a conjugate residual method, a GCR method, a GCR(k) method, an Orthomin(k) method, a GMRES(k) method and their derivative methods.

10. (Currently Amended) An information processing apparatus for optimally designing a structure by obtaining a solution of a structure optimal designing problem~~,~~ ~~formulated as a dual optimization problem~~ having a first solution process to solve an optimization problem of a first evaluation ~~functional~~ function for a status variable vector and a design variable vector ~~and a second solution process to solve an optimization problem of a second evaluation functional for said status variable vector and said design variable vector~~, wherein ~~said~~ the status variable vector is a displacement in each node, and ~~said~~ the design variable vector is ~~an~~ a rate of existence ~~ratio of~~ to a structural member in each element, said apparatus comprising[[:]] a first solution module adapted to execute said first solution process[[,]] and ~~including~~ comprising:

design variable update means for reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a first storage unit, updating ~~said~~ the design variable vector, and storing the updated design variable vector into said first storage unit; ~~and~~

~~second solution module adapted to execute said second solution process by a conjugate gradient method during said first solution process, and including preconditioning means for performing preconditioning on a nodal force vector based on a global stiffness matrix,~~ ~~and~~ status variable update means for reading ~~said~~ the design variable vector and ~~said~~ the status

variable vector stored in a second storage unit, updating ~~said~~ the status variable vector, and storing the updated status variable vector into said second storage unit, said status variable update means including a second solution module adapted to execute a second solution process to solve an optimization problem of a second evaluation function for the status variable vector and the design variable vector, wherein the second evaluation function corresponds a norm of a residual vector which is obtained as a difference between a nodal force vector and the status variable vector on which a global stiffness matrix is operated, and said second solution process comprising a conjugate gradient method, and including a preconditioning step of executing preconditioning on a nodal force vector based on a global stiffness matrix, and the ~~wherein said~~ status variable vector is not initialized upon start of ~~processing by~~ said second solution ~~means~~ process; and

output means for outputting the obtained solution.

11. (Original) The information processing apparatus according to claim 10, wherein said first solution module performs any one of a sequential linear programming method, an optimality criteria method, and a sequential convex function approximate method.

12. (Original) The information processing apparatus according to claim 10, wherein said preconditioning means sets a component in a row or column of the nodal force vector to 0 when a diagonal component in the corresponding row or column of the global stiffness matrix becomes 0.

13. (Currently Amended) A program stored in a computer-readable storage medium to be executed by an information processing apparatus for optimally designing a structure, and comprising a module of obtaining a solution of a structure optimal designing problem~~, formulated as a dual optimization problem~~ having a first solution process to solve an optimization problem of a first evaluation ~~functional~~ function for a status variable vector and a design variable vector ~~and a second solution process to solve an optimization problem of a second evaluation functional for said status variable vector and said design variable vector~~, wherein ~~said~~ the status variable vector is a displacement in each node, and ~~said~~ the design variable vector is ~~an~~ a rate of existence ~~ratio of~~ to a structural member in each element, said module comprising[[:]] a first solution module adapted to execute said first solution process[[,]] and ~~including~~ comprising:

a design variable update step of reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a first storage unit, updating ~~said~~ the design variable vector, and storing the updated design variable vector into said first storage unit; ~~and~~

~~second solution module adapted to execute said second solution process during said first solution process, and including~~ a status variable update step of reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a second storage unit, updating ~~said~~ the status variable vector, and storing the updated status variable vector into said second storage unit, said status variable update step including a second solution module adapted to execute a second solution process to solve an optimization problem of a second evaluation function for the status variable vector and the design variable vector, wherein ~~said~~ the second

~~solution module uses~~ evaluation function corresponds a norm of a residual vector which is obtained as a difference between a nodal force vector and the status variable vector on which a global stiffness matrix is operated ~~as said second evaluation function~~, and ~~said~~ the status variable vector is not initialized upon start of ~~processing by~~ said second solution ~~module~~ process; and

an output step of outputting the obtained solution.

14. (Currently Amended) A program stored in a computer-readable storage medium to be executed by an information processing apparatus for optimally designing a structure, and comprising a module of obtaining a solution of a structure optimal designing problem~~, formulated as a dual optimization problem~~ having a first solution process to solve an optimization problem of a first evaluation ~~functional~~ function for a status variable vector and a design variable vector ~~and a second solution process to solve an optimization problem of a second evaluation functional for said status variable vector and said design variable vector~~, wherein ~~said~~ the status variable vector is a displacement in each node, and ~~said~~ the design variable vector is ~~an~~ a rate of existence ~~ratio of~~ to a structural member in each element, said module comprising[[:]] a first solution module adapted to execute said first solution process[[,]] and ~~including~~ comprising:

a design variable update step of reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a first storage unit, updating ~~said~~ the design variable vector, and storing the updated design variable vector into said first storage unit; ~~and~~

~~second solution module adapted to execute said second solution process by a conjugate gradient method during said first solution process, and including preconditioning step of performing preconditioning on a nodal force vector based on a global stiffness matrix,~~ ~~and~~ a status variable update step of reading ~~said~~ the design variable vector and ~~said~~ the status variable vector stored in a second storage unit, updating ~~said~~ the status variable vector, and storing the updated status variable vector into said second storage unit, said status variable update step including a second solution module adapted to execute a second solution process to solve an optimization problem of a second evaluation functional for the status variable vector and the design variable vector, wherein the second evaluation function corresponds a norm of a residual vector which is obtained as a difference between a nodal force vector and the status variable vector on which a global stiffness matrix is operated, and said second solution process comprising a conjugate gradient method, and including a preconditioning step of executing preconditioning on a nodal force vector based on a global stiffness matrix, and the ~~said~~ status variable vector is not initialized upon start of ~~processing by~~ said second solution ~~means~~ process; and

an output step of outputting the obtained solution.